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| EXAMINER |
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DUNCAN, MARC M

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| ART UNIT | PAPER NUMBER |
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2113

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 03/20/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/810,037

Applicant(s)

PURDY, MATTHEW A.

Examiner

Marc Duncan

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28 and 29 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-18 and 20-27 is/are rejected.
- 7) ☒ Claim(s) 6 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

FINAL REJECTION

Status of the Claims

Claims 1-5, 7-8, 10-18, 20-21 and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satya et al. (6,751,519) in view of Hsieh (2003/0060916).

Claims 9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satya and Hsieh as applied to claims 1 and 14 above and further in view of Atkinson et al. (2004/0029029).

Claims 6 and 19 are objected to.

Claims 28 and 29 are allowed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-5, 7-8, 10-18, 20-21 and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satya et al. (6,751,519) in view of Hsieh (2003/0060916).

Regarding claim 1:

Satya teaches receiving fault classification data associated with a fault condition (col. 4 lines 47-53 and lines 64-67); and

estimating at least one yield parameter of the wafer based on the fault classification data (col. 4 lines 64-67).

Satya does not explicitly teach the fault data being associated with a tool fault condition that is associated with a process tool for processing a wafer. Satya does, however, teach examining defects and classifying the defects of a wafer.

Hsieh teaches that defect data of a wafer is associated with a process tool fault condition that is associated with a process tool for processing a wafer (paragraphs 0026 and 0028 – if a wafer contains defects, it is determined which machine processed the wafer).

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the process tool association of Hsieh with the defect data and yield prediction of Satya.

One of ordinary skill in the art at the time of invention would have been motivated to make the combination because Hsieh teaches that associating the process tool fault condition with the defect data allows for the process tool to be calibrated to lower the possibility of defect occurrence (paragraph 0028).

Regarding claim 2:

Satya teaches:

wherein estimating the at least one yield parameter further comprises estimating an overall yield parameter (col. 5 lines 14-16 and col. 7 line 65-col. 8 line 2).

Regarding claim 3:

Satya teaches:

wherein estimating the overall yield parameter further comprises estimating a number of die lost (col. 7 line 65-col. 8 line 2 – estimating final wafer yield inherently includes estimating a number of die lost).

Regarding claim 4:

Satya teaches:

wherein estimating the overall yield parameter further comprises estimating a percentage of die lost (col. 7 line 65-col. 8 line 2 – the number of dice are known. If a final yield is estimated, simply dividing the estimated final yield by the total gives the percentage).

Regarding claim 5:

Satya teaches:

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wherein estimating the at least one yield parameter further comprises estimating a performance yield parameter (col. 11 lines 12-47 – estimating failure probability clearly reads on a performance parameter prediction).

Regarding claim 7:

Satya teaches:

wherein estimating the at least one yield parameter further comprises associating at least one estimated yield parameter with a fault class specified by the fault classification data (col. 4 lines 64-67 and col. 12 lines 17-36).

Regarding claim 8:

Satya teaches:

determining an actual yield parameter for a wafer (col. 8 lines 61-66); and updating the estimated yield parameter based on the actual yield parameter (col. 8 lines 61-66).

Regarding claim 10:

Satya teaches:

further comprising scrapping the wafer responsive to the estimated yield parameter being outside a predetermined range (col. 8 lines 38-44).

Regarding claim 11:

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Satya teaches:

determining process/step data associated with the tool fault condition (col. 7 line 65-col. 8 line 2); and

estimating at least one yield parameter based on the fault classification data and the process/step data (col. 7 line 65-col. 8 line 2).

Regarding claim 12:

Satya teaches:

further comprising estimating a plurality of yield parameters based on the fault classification data and the process/step data (col. 7 line 65-col. 8 line 2).

Regarding claim 13:

Satya teaches:

further comprising estimating a plurality of yield parameters based on the fault classification data (col. 7 line 65-col. 8 line 2).

Regarding claims 14-18, 20-21 and 23-27:

The claims are rejected as the systems for performing the methods of claims 1-5, 7-8 and 10-13.

Claims 9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satya and Hsieh as applied to claims 1 and 14 above and further in view of Atkinson et al. (2004/0029029).

Regarding claims 9 and 22:

The teachings of Satya and Hsieh are outlined above.

Satya and Hsieh do not explicitly teach removing a process tool associated with a tool fault condition from service if the estimated yield parameter is outside a predetermined range. Satya and Hsieh do, however, teach taking necessary measures if an estimated yield parameter is outside a predetermined range.

Atkinson teaches removing a process tool associated with a fault condition from service if the estimated yield parameter is outside a predetermined range (paragraph 0026).

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the tool shutdown procedure of Atkinson with the manufacturing process of Satya and Hsieh.

One of ordinary skill in the art would have been motivated to make the combination because Atkinson teaches that shutting down a process tool avoids problems that threaten multiple lots of wafers (paragraph 0026).

Allowable Subject Matter

Claims 6 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Prior art was not found that explicitly teaches or fairly suggests the speed yield parameter estimation as outlined in claims 6, 19, 28 and 29. This limitation is considered allowable only in combination with all limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marc Duncan whose telephone number is 571-272-3646. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on 571-272-3645. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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